WHAT IS CLAIMED IS:

1. A direction measurement method for measuring direction of a receiver as seen from a transmitter of a base station, comprising the steps of:

transmitting first and second signals, which have been spread by mutually orthogonal spreading codes, from antennas of a base station that are disposed at different positions, or transmitting the same signal as first and second signals by time-shared transmission from antennas of a base station that are disposed at different positions;

receiving by a receiver the first and second signals transmitted from respective ones of the antennas and obtaining a phase difference between the first and second signals received; and

calculating direction of the receiver, as seen from a transmitter of the base station, based upon the phase difference.

2. The method according to claim 1, wherein the receiver obtains a path among multipaths along which a signal arrives earliest and calculates the phase difference between the first and second received signals that arrive via this path.

3. A method of controlling direction of radio-wave emission of a base-station transmitter which emits radio waves in the direction of a receiver using a directional antenna, comprising the steps of:

transmitting first and second signals, which have

been spread by mutually orthogonal spreading codes, from antennas of a base station that are disposed at different positions, or transmitting the same signal as first and second signals by time-shared transmission from antennas of a base station that are disposed at different positions;

receiving by a receiver the first and second signals transmitted from respective ones of the antennas and obtaining a phase difference between the first and second signals received;

calculating direction of the receiver, as seen from a transmitter of the base station, based upon the phase difference;

feeding the calculated direction back from the receiver to the base station; and

transmitting data by emitting radio waves from the base-station transmitter upon providing the radio waves with directivity in the direction of the receiver based upon the calculated direction.

4. The method according to claim 3, wherein the receiver obtains a path among multipaths along which a signal arrives earliest and calculates the phase difference between the first and second received signals that arrive via this path.

5. A method of controlling direction of radio-wave emission of a base-station transmitter which emits radio waves in the direction of a receiver using a directional antenna, comprising the steps of:

transmitting first and second signals, which have been spread by mutually orthogonal spreading codes, from antennas of a base station that are disposed at different positions, or transmitting the same signal as first and second signals by time-shared transmission from antennas of a base station that are disposed at different positions;

receiving by a receiver the first and second signals transmitted from respective ones of the antennas and obtaining phases of the first and second signals received or a phase difference between the first and second signals received;

feeding the obtained phases or phase difference back from the receiver to the base station;

calculating, at the base-station transmitter, direction of the receiver, as seen from the transmitter, based upon the phases or phase difference; and

transmitting data by emitting radio waves from the base-station transmitter upon providing the radio waves with directivity in the direction of the receiver based upon the direction calculated.

6. The method according to claim 5, wherein the receiver obtains a path among multipaths along which a signal arrives earliest and calculates the phase difference between the first and second received signals that arrive via this path.

7. A method of controlling direction of radio-wave emission of a base-station transmitter which emits radio

waves from an equally spaced linear array antenna upon providing the radio waves with directivity in the direction of a receiver, comprising the steps of:

transmitting first and second signals, which have been spread by mutually orthogonal spreading codes, from two antennas disposed at positions spaced apart by a distance that is equal to an interval of antenna elements of an equally spaced linear array antenna, or transmitting the same signal as first and second signals by time-shared transmission from these two antennas;

receiving by a receiver the first and second signals transmitted from respective ones of the antennas and obtaining a phase difference ϕ between the first and second signals received;

feeding the phase difference ϕ back from the receiver to the base station; and

emitting radio waves upon providing the radio waves with directivity in the direction of the receiver by successively applying the phase difference in steps of ϕ to a data signal input to each of the antenna elements of the equally spaced linear array antenna at the base-station transmitter.

8. The method according to claim 7, wherein the receiver obtains a path among multipaths along which a signal arrives earliest and calculates the phase difference between the first and second received signals that arrive via this path.

9. A method of controlling direction of radio-wave

emission of a base-station transmitter which emits radio waves from an equally spaced linear array antenna, which has 1^{st} to n^{th} antenna elements, upon providing the radio waves with directivity in the direction of a receiver, comprising the steps of:

generating first and second reference signals that have been spread by mutually orthogonal spreading codes;

inputting signals, which have been obtained by applying a predetermined phase difference successively to the first reference signal, to 1^{st} to $(n-1)^{th}$ antenna elements of the equally spaced linear array antenna in succession, and inputting signals, which have been obtained by applying said phase difference successively to the second reference signal, to 2^{nd} to n^{th} antenna elements of the equally spaced linear array antenna in succession in such a manner that a phase reference point of the first and second reference signals will be shifted by an amount equivalent to an interval of the antenna elements of the equally spaced linear array antenna;

receiving by a receiver the first and second reference signals transmitted from a base-station transmitter and obtaining a phase difference ϕ_1 between the first and second reference signals received;

feeding the phase difference ϕ_1 back from the receiver to the base station; and

emitting radio waves upon providing the radio waves with directivity in the direction of the receiver by

successively applying the phase difference in steps of ϕ_1 to a data signal input to each of the antenna elements of the equally spaced linear array antenna at the base-station transmitter.

10. The method according to claim 9, wherein the receiver obtains a path among multipaths along which a signal arrives earliest and calculates the phase difference between the first and second reference signals that arrive via this path.

11. A method of controlling direction of radio-wave emission of a base-station transmitter which emits radio waves from an equally spaced linear array antenna, which has 1^{st} to n^{th} antenna elements, upon providing the radio waves with directivity in the direction of a receiver, comprising the steps of:

generating a first signal as first and second reference signals by timing sharing;

inputting signals, which have been obtained by applying a predetermined phase difference successively to the first reference signal, to 1^{st} to $(n-1)^{th}$ antenna elements of the equally spaced linear array antenna in succession, and inputting signals, which have been obtained by applying said phase difference successively to the second reference signal, to 2^{nd} to n^{th} antenna elements of the equally spaced linear array antenna in succession in such a manner that a phase reference point of the first and second reference signals will be shifted by an amount equivalent to an interval of the

antenna elements of the equally spaced linear array antenna;

receiving by a receiver the first and second reference signals transmitted from a base-station transmitter in time-shared fashion and obtaining a phase difference ϕ_1 between the first and second signals received at different timings; and

feeding the phase difference ϕ_1 back from the receiver to the base station; and

emitting radio waves upon providing the radio waves with directivity in the direction of the receiver by successively applying the phase difference in steps of ϕ_1 to a data signal input to each of the antenna elements of the equally spaced linear array antenna at the base-station transmitter.

12. A radio receiver for measuring direction of a receiver as seen from a base-station transmitter, comprising:

a demodulator for receiving and demodulating first and second signals, which have been spread by mutually orthogonal spreading codes and transmitted, from antennas of a base station that are disposed at different positions, or receiving and demodulating first and second signal transmitted by time sharing from antennas of a base station that are disposed at different positions;

a phase-difference calculation unit for calculating a phase difference between the first and second signals

transmitted from respective ones of the antennas; and

a direction calculation unit for calculating direction of the receiver, as seen from the base station, based upon the phase difference.

13. The apparatus according to claim 12, wherein the receiver obtains a path among multipaths along which a signal arrives earliest and calculates the phase difference between the first and second signals that arrive via this path.

14. A base-station transmitter for emitting radio waves upon providing the radio waves with directivity in the direction of a receiver, comprising:

means for generating first and second signals that have been spread by mutually orthogonal spreading codes;

two antennas disposed at different positions for transmitting the first and second signals;

a demodulator for receiving from a receiver and demodulating (a) the phases of the first and second signals, which have been transmitted from respective ones of said antennas, at the receiver, or (b) phase difference between each of these signals at the receiver, or (c) direction of the receiver, as seen from the base-station transmitter, calculated based upon said phase difference at the receiver; and

a directional antenna for transmitting data by emitting radio waves upon providing the radio waves with directivity in the direction of the receiver based upon the phases, phase difference or direction of the

receiver.

15. A base-station transmitter for emitting radio waves from an antenna upon providing the radio waves with directivity in the direction of a receiver, comprising:

two antennas disposed at different positions for transmitting one signal as first and second signals by time sharing;

a demodulator for receiving from a receiver and demodulating (a) the phases of the first and second signals, which have been transmitted from respective ones of said antennas, at the receiver, or (b) phase difference between each of these signals at the receiver, or (c) direction of the receiver, as seen from the base-station transmitter, calculated based upon said phase difference at the receiver; and

a directional antenna for transmitting data by emitting radio waves upon providing the radio waves with directivity in the direction of the receiver based upon the phases, phase difference or direction of the receiver.

16. A base-station transmitter for emitting radio waves from an antenna upon providing the radio waves with directivity in the direction of a receiver, comprising:

means for generating first and second reference signals that have been spread by mutually orthogonal spreading codes;

an equally spaced linear array antenna, which has 1^{st} to n^{th} antenna elements, for emitting the first and

second reference signals and a data signal;

means for inputting signals, which have been obtained by applying a predetermined phase difference successively to the first reference signal, to 1^{st} to $(n-1)^{th}$ antenna elements of the equally spaced linear array antenna in succession, and inputting signals, which have been obtained by applying said phase difference successively to the second reference signal, to 2^{nd} to n^{th} antenna elements of the equally spaced linear array antenna in succession in such a manner that a phase reference point of the first and second reference signals will be shifted by an amount equivalent to an interval of the antenna elements of the equally spaced linear array antenna;

a demodulator for receiving from the receiver and demodulating a phase difference ϕ_1 between the first and second signals, which have been transmitted from respective ones of said antennas, at the receiver; and

means for successively applying the phase difference in steps of ϕ_1 to the data signal and inputting the resultant signals to each of the antenna elements of said equally spaced linear array antenna;

whereby data is transmitted toward the receiver by emitting radio waves upon providing the radio waves with directivity in the direction of the receiver.

17. A base-station transmitter for emitting radio waves from an antenna upon providing the radio waves with directivity in the direction of a receiver, comprising:

means for generating the same reference signal as first and second reference signals in time-shared fashion;

an equally spaced linear array antenna, which has 1^{st} to n^{th} antenna elements, for emitting the reference signal and a data signal;

means for inputting signals, which have been obtained by applying a predetermined phase difference successively to the first reference signal, to 1^{st} to $(n-1)^{th}$ antenna elements of the equally spaced linear array antenna in succession, and inputting signals, which have been obtained by applying said phase difference successively to the second reference signal, to 2^{nd} to n^{th} antenna elements of the equally spaced linear array antenna in succession in such a manner that a phase reference point of the first and second reference signals will be shifted by an amount equivalent to an interval of the antenna elements of the equally spaced linear array antenna;

a demodulator for receiving from the receiver and demodulating a phase difference ϕ_1 between the first and second signals, which have been transmitted from respective ones of said antennas in time-shared fashion, at the receiver; and

means for successively applying the phase difference in steps of ϕ_1 to the data signal and inputting the resultant signals to each of the antenna elements of said equally spaced linear array antenna;

whereby data is transmitted toward the receiver by emitting radio waves upon providing the radio waves with directivity in the direction of the receiver.